6) $Ln|\sin x| < 0$

$\Leftrightarrow 0 < |\sin x| < 1$

$\Leftrightarrow x \neq \frac{k\pi}{2}; k \in \square$

$car\ 0 \leq |\sin x| \leq 1$

$\forall x \in IR$

$S_{IR} = IR \setminus \left\{ k\frac{\pi}{2}; k \in \square \right\}$

EX 3

1) $f(x) = \frac{Ln(x+2)}{(x+2)+1}$

On pose $X = x+2$

$\lim\limits_{x \to +\infty} f(x) = \lim\limits_{x \to +\infty} \frac{LnX}{X+1}$

$= \lim\limits_{x \to +\infty} \left(\frac{X}{X+1} \right) . \frac{LnX}{X}$

$= 1 \times 0 = 0$

2) $f(x) = \frac{Ln(2x+3)}{\sqrt[3]{x}}$

On pose $X = \sqrt[3]{x} \Rightarrow x = X^3$

$x \to +\infty \Rightarrow X \to +\infty$

$\lim\limits_{x \to +\infty} f(x) = \lim\limits_{X \to +\infty} \frac{Ln(2X^3+3)}{X}$

$= \lim\limits_{X \to +\infty} \frac{Ln\left[X^3 \left(2 + \frac{3}{X^3} \right) \right]}{X}$

$= \lim\limits_{X \to +\infty} \frac{Ln(X^3)}{X} + \frac{Ln\left(2 + \frac{3}{X^3} \right)}{X}$

$= \lim\limits_{X \to +\infty} \frac{3LnX}{X} + \frac{Ln\left(2 + \frac{3}{X^3} \right)}{X}$

$= 0$

3) $f(x) = \frac{x^2 - 2}{xLnx}$

Pour $x > 1$

$f(x) = \frac{\left(1 - \frac{2}{x^2} \right)}{\left(\frac{Lnx}{x} \right)}$

$\lim\limits_{x \to +\infty} f(x) = \lim\limits_{x \to +\infty} \frac{\left(1 - \frac{2}{x^2} \right)}{\left(\frac{Lnx}{x} \right)} = +\infty$

(de la forme $\frac{1}{0^+}$)

4) pour $x > 0$

$f(x) = \frac{Ln\left[x^2 \left(1 - \frac{3}{x} + \frac{7}{x^2} \right) \right]}{x}$

$= \frac{Ln(x^2)}{x} + \frac{Ln\left(1 - \frac{3}{x} + \frac{7}{x^2} \right)}{x}$

$f(x) = 2\frac{Lnx}{x} + \frac{Ln\left(1 - \frac{3}{x} + \frac{7}{x^2} \right)}{x}$

$\lim\limits_{x \to +\infty} f(x) = 0 + 0 = 0$

5) $x > 0$ (même travaille)

$f(x) = \frac{5Lnx}{x} + \frac{Ln\left(1 - \frac{1}{x^2} \right)}{x}$

$\lim\limits_{x \to +\infty} f(x) = 0$

Qarray.tn -Aqra Blech- Qarray.tn